



# **The Results of the Evaluation of Using Lightning Data to Improve Oceanic Convective Forecasting for Aviation**

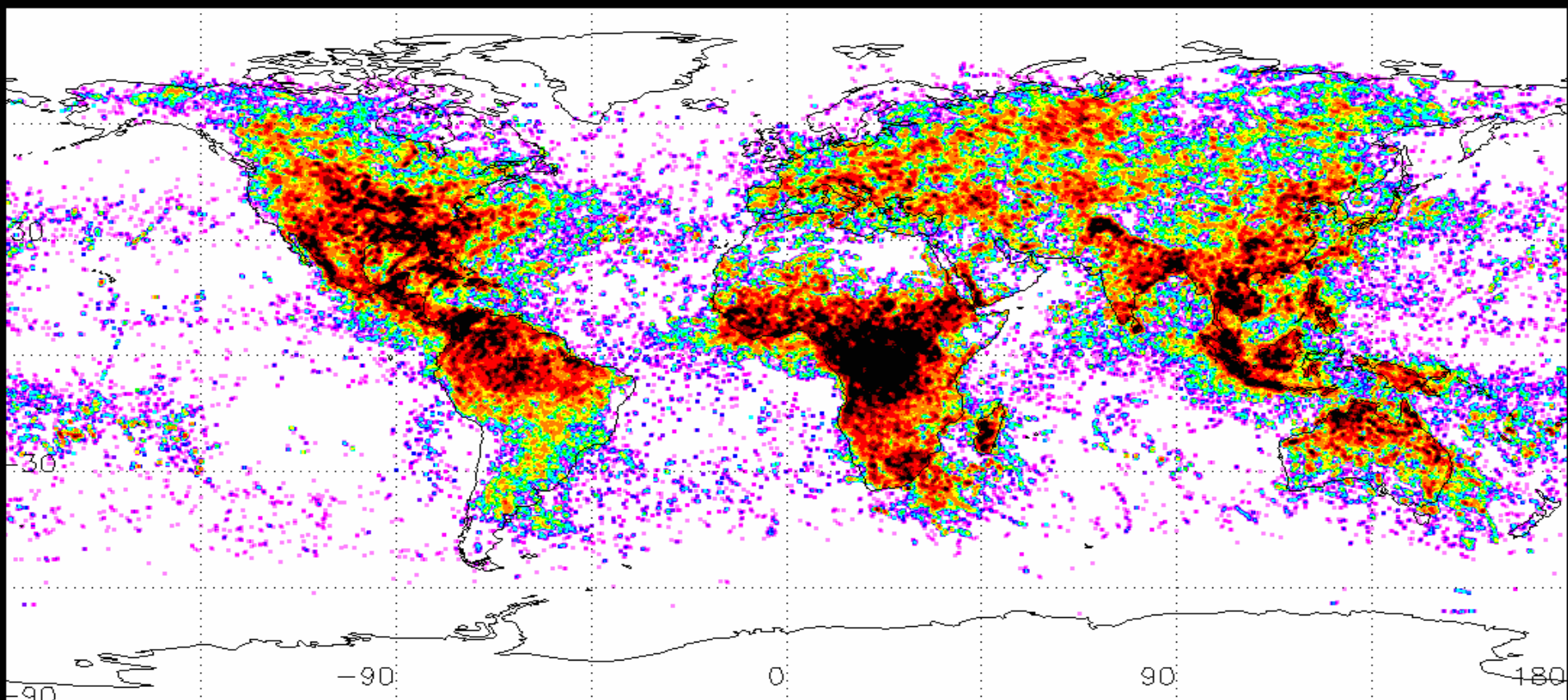
**Wx Accident Prevention Review (NASA)**

**Cleveland, Ohio**

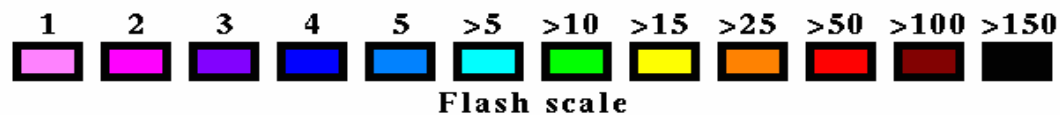
**June 5, 2001**

**Dr. Alan Nierow - FAA ([alan.nierow@faa.gov](mailto:alan.nierow@faa.gov))**

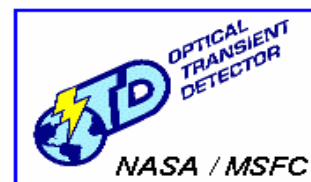
# TOTAL LIGHTNING FROM NASA's OTD (1998)



Orbits 3042  
Areas 137454  
Flashes 795063  
Groups 3758261  
Events 7685027  
(Created : 06/07/99)



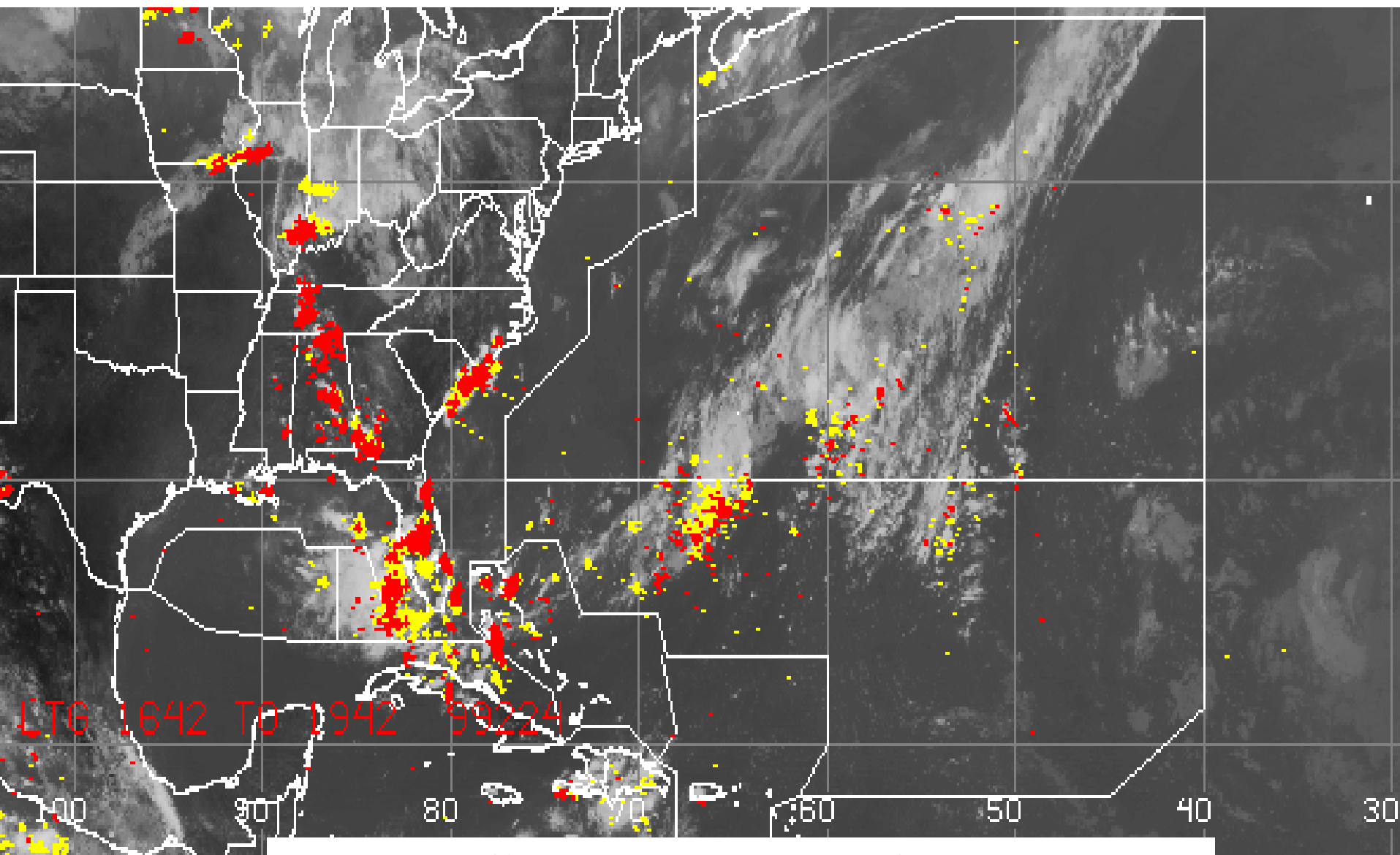
January 1, 1998 – December 31, 1998



# Oceanic Lightning Experiment

- **WHY:**
  - **International Convective SIGMET Coverage (by AWC)**
  - **Explore possible requirement from other agencies**
- **WHO:**
  - **Sponsors: AWC, Global Atmospherics Inc (GAI) & FAA.**
  - **Networks: U.S., Canada, France, Germany & Japan.**
- **PARTICIPATION:**
  - FAA → Oceanic ARTCCs (OAK, NYC) + MIA/JAX**
    - **CWSUs & Traffic Managers**
  - Other → NWS/DoD/Airlines for Evaluation**
- **WHERE: Gulf of Mexico, Atlantic & Pacific regions**
- **DURATION: April 1999 - January 2000**

**NOTE: NASA's AWIN Safety program investigating feasibility of displaying lightning data in cockpit**



**AWC product (Atlantic sector)**  
Need for Extended Coverage for  
International Convective SIGMETs

# Participants' Responses

## *ENHANCED SAFETY*

- **AIRLINES** - Yes, the only real-time tool available to meteorologists/dispatchers is satellite imagery which users often have trouble interpreting.
- **NWS/FAA** - This product can identify concentrated areas of convection outside of previous limitations, it most certainly has the potential of enhancing safety.
- **DOD** - Helps us avoid areas of turbulence caused by convection which cannot be predicted by current weather models.
- **FAA** - The ability to better predict and avoid areas of severe weather will increase the safety of flights.

# Participants' Responses (cont'd)

## *INCREASED EFFICIENCY*

- **AIRLINES** - Knowing where the convective areas are enhances pre-flight planning which will save fuel...the product should be available to ATC, pilots and dispatchers.
- **NWS/FAA** - An oceanic weather short-term planning product (similar to convective SIGMETS) could be developed as a result of this product.
- **DOD** - Fuel savings and better routing would also result from the product.
- **FAA** - This product can allow controllers to slightly alter the routings if needed and keep the traffic flowing smoothly. There will be much less “reaction” to weather events based on PIREPS and deviation requests.

# Results of the Experiment

- **Lightning data found useful for producing International Convective SIGMETs**
  - Provides AWC forecasters means of detecting oceanic convection in satellite imagery
- **FAA personnel (TMU)/Airlines found it useful for flight planning over Gulf of Mexico, Western Atlantic, and Caribbean regions**
- **CWSUs issued Center Wx Advisory based upon this product**
- **DoD personnel used data to**
  - Delineate potential areas of turbulence or windshear
  - Assist in pre-flight briefings over Caribbean & Central America
- **Concerns**
  - Tropical/Mid Pacific & Eastern Atlantic: Accuracy & detection efficiency needs improvement

# SUMMARY

- **Collaborative Decision Making/Situational Awareness**
    - Capability to differentiate between clouds (cirrus) and convection
    - Improved common situational awareness of hazardous weather by ATC, dispatch & cockpit
    - Earlier track adjustment - minimal route deviation & enhanced thunderstorm detection in data-sparse regions
  - **Future work**
    - Possible use of operational/experimental product via Internet, FAA WX system (WARP) for use by Traffic Managers and also into cockpit
    - Oceanic Convective products could utilize satellite/model data and *lightning* data for Strategic and Tactical planning purposes
      - OCND
- \* Note: MIT/LL study cited a \$16M potential savings due more efficient flight routing & reduced incidence of turbulence-related injuries for Atlantic, Caribbean & South America